BRIDGING THE INFORMATION TECHNOLOGY DIVIDE IN AFRICA

HEARING

BEFORE THE

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OF THE

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BRIDGING THE INFORMATION TECHNOLOGY DIVIDE IN AFRICA

WEDNESDAY, MAY 16, 2001

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON AFRICA,
COMMITTEE ON INTERNATIONAL RELATIONS,
Washington, DC.

The Subcommittee met, pursuant to call, at 2:35 p.m. in Room 2172, Rayburn House Office Building, Hon. Edward R. Royce [Chairman of the Subcommittee] presiding.

Mr. ROYCE. The hearing of the Subcommittee on Africa will come to order. If I can ask everybody to take their seats at this time.

This hearing is going to be on bridging the information technology divide in Africa. Many Africans and others are concerned that African countries are being left behind as information and communications technology continues to transform economic, social, and cultural developments worldwide. Africa lags behind other regions of the world in usage of the Internet, the most powerful medium for mass communication the world has ever known. The international community is increasingly focused on this digital divide, being particularly aware that IT is a significant factor in attracting foreign investment and fueling economic growth.

The World Bank reported that the information revolution offers Africa a dramatic opportunity to leapfrog into the future, breaking out of decades of stagnation or decline. It warned, though, that Africa must seize this opportunity quickly. If African countries cannot take advantage of the information revolution and surf this great wave of technological change, they may be crushed by it. That is their report.

The concern is that without information technology tools, Africa will be unable to expand or even maintain its already very low level of engagement with the world marketplace. Africa also risks foregoing the advantages information technology brings to confronting educational and health and governance and other challenges. These concerns led the U.S. Agency for International Development to launch its Leland Initiative in 1996. The Initiative aims to promote Internet connectivity in Africa. This hearing aims to assess the Leland Initiative, while exploring the potential of IT in Africa and the roadblocks to its expansion.

Information technology is already bringing benefits to Africa. These include:

Improved flow of information: Some 120 African newspapers and news magazines are now available online.

Job creation: A major U.S. health insurer is now processing claims in Ghana using telecomputing technology.

Economic integration: A West African woman's fishing cooperative has set up a Web site to enable its 7,000 members to monitor export markets and negotiate prices with overseas buyers.

Education: Medical students in Senegal are being instructed by doctors in Belgium through video link.

Accountability: The Southern African Development Council Parliamentary Forum is using the Internet to encourage greater government accountability, and this effort addresses issues of conflict resolution, of HIV/AIDS, of regional economic integration and parliamentary cooperation and oversight. Democracy activists throughout Africa are using e-mail to press for democratic change.

Unfortunately, while there has been considerable IT expansion on the continent over the last decade, every African nation now enjoys Internet connectivity, Africa is not expanding its IT as rapidly as the rest of the world. While Africa has an estimated 2.6 percent of the world's Internet connections today, this figure is expected to decrease to 1 percent by 2005. The World Bank and USAID and other institutions have been focused on aiding African governments in establish ing a regulatory environment encouraging of critical IT investment, and this means liberalization. Added challenges to IT expansion in Africa include training, affordability and illiteracy.

Despite the benefits of IT, some have questioned whether its development should be a priority for African countries. Why, some ask, should resources be devoted to IT when tens of millions of Africans lack running water and electricity, and some of us remember that quote. Others, and I include myself in this camp, believe that IT development now is largely a matter of private sector investment; hence, it is not a public sector resource drain at all, and that IT is increasingly central to economic growth, which is a prerequisite to addressing the health and the environment and the government and the myriad of other challenges that Africa faces. We should also weigh the fact that African governments appear committed to developing the continent's information technology infrastructure.

We have several knowledgeable witnesses lined up, and I look forward to a lively discussion on this important issue. I will now turn to the Ranking Member.

[The prepared statement of Mr. Royce follows:]

PREPARED STATEMENT OF THE HONORABLE EDWARD R. ROYCE, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA, AND CHAIRMAN, SUBCOMMITTEE ON AFRICA

WASHINGTON, D.C.—The following is the statement made by Africa Subcommittee Chairman Ed Royce (R–CA–39) at today's hearing on the informational technology divide in Africa.

"Many Africans and others are concerned that African countries are being left behind as information and communications technology continues to transform economic, social, and cultural developments worldwide. Africa lags behind other regions of the world in usage of the Internet, the most powerful medium for mass communication the world has ever known. The international community is increasingly focused on this "digital divide," being particular aware that IT is a significant factor in attracting foreign investment and fueling economic growth. The World Bank reported in 1995 that, "The information revolution offers Africa a dramatic opportunity to leapfrog into the future, breaking out of decades of stagnation or decline." It warned though that, "Africa must seize this opportunity, quickly. If African coun-

tries cannot make advantage of the information revolution and surf this great wave of technological change, they may be crushed by it." The concern is that without IT tools, Africa will be unable to expand, or even maintain, its already very low level of engagement with the world marketplace. Africa also risks forgoing the advantages IT brings to confronting educational, health, governance and other challenges. These concerns led the U.S. Agency for International for Development to launch its Leland Initiative in 1996. The Initiative aims to promote Internet connectivity in Africa. This hearing aims to assess the Leland Initiative, while exploring the potential of IT in Africa and the roadblocks to its expansion.

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- Education: Medical students in Senegal are being instructed by doctors in Belgium via video link.
- Accountability: The Southern Africa Development Council's Parliamentary Forum is using the Internet to encourage greater government accountability. This effort addresses issues of conflict resolution, HIV/AIDS, regional economic integration, and parliamentary cooperation and oversight. Democracy activists throughout Africa are using e-mail to press for democratic change.

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Despite the benefits of IT, some have questioned whether its development should be a priority for African countries. Why, some ask, should resources be devoted to IT when tens of millions of Africans lack running water and electricity? Others, and I include myself in this camp, believe that IT development now is largely a matter of private sector investment, hence it is not a public sector resource drain, and that IT is increasingly central to economic growth, which is a prerequisite to addressing the health, environment, government and myriad other challenges Africa faces. We should also weigh that fact that African governments appear committed to developing the continent's IT infrastructure."

Mr. ROYCE. Mr. Payne has stepped out. Without objection, his statement will be put in the record.

[The prepared statement of Mr. Payne follows:]

PREPARED STATEMENT OF THE HONORABLE DONALD M. PAYNE, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEW JERSEY

Thank you very much for calling this hearing on Africa and the Digital Divide. There has been substantial controversy surrounding the role of new information and communication technologies (ICT) in development especially in Africa. I know that South Africa's President, Thabo Mbeki, recently made the case for bridging the digital divide. However, Bill Gates, CEO of Microsoft, says that "people need healthcare not laptops."

It would seem to me that the expanding IT role in Africa and the ability to provide adequate healthcare are not mutually exclusive. We have a long way to go but IT offers Africa, like the rest of its neighbors, great potential benefits.

I have seen first-hand the use of IT in the area of distance learning. I also had an opportunity to travel with the Discovery Channel to their satellite locations in South Africa. I was truly impressed but I know we will hear more from Dr. Ifshin [when she testifies.]

It seems to me that there is great potential in using new information and communication technologies (ITC) to boost higher education and professional training in Africa. The U.S. is a world leader both in higher education and new technologies and could conceivably beam course content to the continent.

In fact, I know of one organization—the African Virtual University (AVU)—that is doing this right now—providing course content from American colleges and universities via satellite to African institutions. In fact, one of their partner institutions is from home state, New Jersey—the New Jersey Institute of Technology (NJIT)—the very first American institution to provide content over the AVU network. There are also applications related to HIV/AIDS and African Growth and Opportunity Act.

I would be interested in hearing the panelists' views on the potential for using these new technologies to deliver courses to African students and professionals where they work and live, in Africa. Thank you.

Mr. ROYCE. Let me introduce our first panel. Mr. Lane Smith has been the coordinator of the Leland Initiative for the U.S. Agency for International Development since 1995. He has worked on international development for more than three decades. Mr. Smith received an undergraduate degree from the University of Utah and completed his upper graduate work at the University of Oregon.

Mr. Smith, please keep this to 5 minutes and summarize your testimony because we have the printed copy in the record.

STATEMENT OF LANE LEE SMITH, COORDINATOR, USAID LELAND INITIATIVE, BUREAU FOR AFRICA, OFFICE OF SUSTAINABLE DEVELOPMENT, UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT

Mr. SMITH. Mr. Chairman, thank you so much. I will be pleased to summarize my written testimony. I want to start out by just thanking you for the opportunity to describe the Leland Initiative and our ability to celebrate the life of—his life, his contributions to Africa and his contributions to developing people around the world. It has been a true privilege to be associated with that.

Mr. ROYCE. We thank you, and we also want to note the presence of Mr. Park, who I understand is here to answer questions, but won't be testifying directly, and we thank you as well.

Mr. SMITH. The Leland Initiative was launched in 1996 and essentially set forth three strategic objectives we wanted to get the policies right in Africa. We wanted to help African governments and the private sector get critical pipes or critical equipment into place, and we wanted to focus on the benefit of the information revolution for the people of Africa through training and the identification of appropriate kinds of applications.

We started the process by inviting 25 African ministers to join us in the Initiative, and we said that we were prepared to work with all of those who wanted to tackle this in an appropriate policy environment. We defined the policy environment as one that was procompetitive, that focused on lowering prices and removing them from the link with international telephone pricing. They wanted to introduce competition instead of sticking with the monopoly telecommunications approach that they had been using and which did not attempt to restrict the free flow of information through the Internet.

Right away 10 countries came forward and said, we would like your help in implementing those policies. For those countries we immediately started working with them to build relationships with their private sectors to establish cost-based approaches to tariffing and help them think their way through policies about the free flow of information.

The next step, of course, is once we had these 10 countries ready to go, we began to realize there were a number of other countries out there that already had some decent policies in place and needed help in building some of their user base, their applications, and we then turned to developing training models that would help their governments, their NGOs, even their newspapers to learn to use the Internet.

What we then found, which is the most interesting, is that a number of countries that originally had said to us, we would rather do it on our own, we would rather stick with a monopoly, or we can't get by with these high revenues, started coming back to us and telling us they were now quite interested in exploring a different way of doing business. So we ended up sitting down with them as well in sort of a third round of the Leland Initiative, if you will, and began helping them to set aside some of the policies they had been trying to live by before.

What I want to do is draw your attention to—I think there is a graphic here which shows the status of the Internet. We began designing the Leland Initiative, and what I would like to do now is point to where the Internet is, I think, now. And so if we could bring up that other graphic.

Now, I want to say that this represents what I consider an African success story, and we were responsible for only a part of that map. There were 10 countries up there on that first map that did not have Internet that we were able to explicitly introduce the equipment, the policies and the other kinds of things like that.

Overall the results of the Leland Initiative were seen in the form of dramatically lower costs. We worked with AT&T to develop a tariffing model that ended up bringing down the prices in the initial Leland countries to less than $2,000, where in the other countries we were not working prices were running 10,000, 12,000, even as much as $14,000 a month for basic wholesale Internet access.

In Leland countries, because of the procompetitive policy and the reach-out to the private sector, we went from a mere handful of Internet service providers to more than 100, and this excludes the Internet service providers in South Africa, because they were the predominant providers at that point. So today in Leland countries outside of South Africa, there are more than 100 indigenous firms that are now investing resources, building out the Internet, reaching out to customers and exploring new kinds of uses.

We estimate that, again, outside of South Africa where the predominant number of Internet subscribers reside, that there are more than 500,000 users now making their way through Leland-supplied equipment, benefiting from Leland-supplied policies.

In terms of the lessons that we have learned from the Leland Initiative, and I think this is probably the most important part of all, the most important, of course, is that the policies really matter. If you don't get the policies right, you are going to really hinder the ability of the African people, the African private sector, the U.S. Private sector in being able to build out this infrastructure, take advantage of that information revolution, run those telephone calling centers that you mentioned in your opening statement, equip those newspapers.

The second thing is that you really need to focus on public-private partnerships. There are certain things that only the public sector can really do, such as establishing the right kind of enabling environment, such as balancing tariffs and providing subsidies only where they are necessary.

The third thing that we learned from this is that if you were to unleash the people of Africa with access to these tools, they will very, very rapidly start taking advantage of them in ways that you never even imagined.

Finally, I would like to comment a little bit on the new directions, because as you mentioned in your testimony, and I myself was struck by the number, currently penetration is 2.6 percent, but expect that to drop to 1 percent as the rest of the world steams away, and I think there are responses that we can take. We are certainly going to be trying to do so through USAID and the Leland Initiative, but primarily it means keeping the focus on deregulation, empowering the private sector and strengthening regulators. And when I say strengthening regulators, I am talking about strengthening their capacity to be able to regulate this private sector in a very positive way.

I think, finally, I would like to just bring to your attention the point that we want to continue to reach out to some of the nontraditional partners that you may not have seen engaged with USAID before. I am thinking of companies like Cisco Systems, AVAYA, Lucent, Hewlett-Packard and other kinds of industries.

Thank you very much for the opportunity, and I am delighted to take questions.

Mr. ROYCE. We thank you, Mr. Smith.

[The prepared statement of Mr. Smith follows:]

PREPARED STATEMENT OF LANE LEE SMITH, COORDINATOR, USAID LELAND INITIATIVE, BUREAU FOR AFRICA, OFFICE OF SUSTAINABLE DEVELOPMENT, UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT

Mr. Chairman and Members—It is an honor to appear before you today and describe the activities of the USAID Leland Initiative. I thank you sincerely for the opportunity.

The Leland Initiative celebrates the life of Mickey Leland, a Texas Congressman who died in a plane crash while on a famine relief mission to Ethiopia in 1989. Throughout his career, Congressman Leland fought to bring the benefits of development to the people of Africa. The Leland Initiative was launched in June 1996 to help bring the information revolution to Africa through connection to the Internet, a fitting tribute to Congressman Leland's dedication and commitment to people everywhere.

Many words would describe what Congressman Leland accomplished, but none better than Courage and Vigor. These two words also characterize the leaders of the Leland Initiative partner countries in Africa.

INTRODUCTION

The Leland Initiative is a story of courageous African policymakers who saw it as an opportunity to do things differently and bring the benefits of the Internet to their people. It is also a story of a vigorous private sector—both African and U.S.—doing what the private sector does best, responding rapidly to the opportunities that these policies created, investing capital, establishing businesses, building infrastructure, and aggressively pursuing new business opportunities.

When the Leland Initiative was launched in June 1996, only a handful of countries in Africa had the Internet, usually a slow and expensive email service limited to the capital cities. Only four years later, in November 2000, Leland Initiative experts established the national Internet gateway in Eritrea, the ninth country brought directly on line by the Leland Initiative, and the final African country to

get Internet access. Seventeen countries have made substantial policy reforms with Leland Initiative assistance, more than 100 indigenous African firms have taken advantage of these reforms to go into business as Internet Service Providers, and up to five hundred thousand Africans in Leland countries are now connecting to the global Internet on a regular basis.

The public-private partnerships established by the Leland Initiative represents the best of American "know how" brought to bear on development challenges in Africa.

WHAT LELAND ACCOMPLISHED

The Leland Initiative was launched in June 1996, when USAID introduced the program to telecommunications ministers from twenty-five African countries at a conference at George Mason University. We described the three "P's" of the Leland Initiative, as follows:

Policies—Helping African governments create an Internet-"friendly" policy environment, consisting of:

- Low prices.
- Introduction of competition.
- The free flow of Information.

Pipes—Providing state-of-the-art telecommunication equipment to bring the Internet to national capitals, extend it to under-served areas and secondary cities and support private sector Internet Service Providers as they deliver a wide range of retail Internet services;

People—Helping individuals and institutions to apply the powerful information and communication tools of the Internet to achieve social and economic development and improve the lives of African citizens everywhere.

At this launch USAID established one important principle—we were only willing to help those countries that wanted to adopt modern, Internet-"friendly" policies. We offered to help them reach out to the private sector to implement these policies, and we offered to provide them with the equipment necessary to establish their national Internet infrastructure, and the training on how to use it. We noted that we would not help those who insisted on doing business the old-fashioned, state monopoly way.

Right away, ten African countries came forward, and the hard work began. Through a partnership with AT&T, USAID showed these first-round countries how to set affordable wholesale prices while still earning a 25% return on investment. These new prices averaged $2,000 per month for a wholesale circuit to an Internet Service Provider, while non-Leland countries were charging $10,000 or more for an equivalent level of service.

Working with a U.S. Internet Service Provider already doing business in Africa, the Leland Initiative helped national phone company officials view the private sector as a partner, rather than as an opponent to be controlled. We brokered meetings among the stakeholders, helping them hammer out transparent—and minimal—licensing procedures. In response to these offers, in each Leland country three, five, or as many as thirteen companies stepped forward, ready to invest an average of $40,000 each to get into this dynamic new business.

When these policies were in place, USAID turned to the U.S. technology sector, using firms in Utah, California, Virginia, Maryland and elsewhere to design modern satellite-based Internet gateways to bring efficient high speed Internet into the national phone companies. We introduced both wireline and wireless technologies to link these gateways to the new Internet Service Providers, and to give them telephone lines so customers could dial into them for Internet access. And we worked with the National phone companies to get the Internet outside the capital cities, installing U.S. technologies that link secondary cities into the national gateways.

The fruits of the Policies and Pipes are being harvested by the People side of the Leland, as the number of Internet users is growing rapidly in all Leland countries. For example, there are more than 8,000 subscribers each in Madagascar and Mozambique, 5,000 in Rwanda, 15,000 in Senegal and 40,000 in Kenya. While these numbers seem small in comparison with the industrial economies, the people are voting with their pocketbooks, paying $30 to $40 a month (a substantial amount in the African economy) for use of this tool. We estimate that three to five people make use of each subscriber account, or several hundred thousand in total.

Faced with the success of their neighbors and seeing the failure of their high prices and state and private monopolies, a number of countries returned to the Leland Initiative to ask for help in implementing policies that they had spurned a few years earlier. In Malawi, for example, when Leland helped the government open up

the market, lower prices, and introduce more affordable technology, eleven firms came forward to request licenses. Today the Internet is booming in Malawi and phone company officials are rushing to quadruple the capacity of the national gateway.

PEOPLE LEVEL IMPACTS

Recognizing that it is not just access to the Internet that is important, but the uses that can be made of it, USAID embarked on a major effort to increase the capacity of African institutions—government, business associations, NGOs, universities, and the like—to use the Internet. We devised an approach that focused on the strategic use of information, rather than the technology, and trained more than 1,500 institutions in Africa in its use. We trained dozens of local trainers in the methodology, and they continue to use it across the continent.

We implemented a series of pilot projects to demonstrate new, Internet-based approaches to doing business in all sectors, many of them in support of U.S. Initiatives such as the Education for Development and Democracy Initiative. Some of the examples include:

SMALL BUSINESS DEVELOPMENT

To address the development challenge of increasing household income for the rural poor, we created an e-commerce activity with Ugandan small businesses, using information technology to improve competitiveness and trade. The results were phenomenal. Within six months of receiving equipment and training, all companies had increased revenue streams (one by 60%), half the companies were able to find inputs through the Internet, reducing their operating expenses and increasing their competitiveness, and all but one of the companies had made business contracts outside Uganda.

WOMEN'S BUSINESS NETWORK

To address the issues of women's access to information technology, we formed a partnership with Kodak to develop the Women's Business Network. With membership from Ghana, Kenya, Uganda, South Africa and the United States, the Women's Business Network promotes use of the Internet in developing trade relationships, expanding access to critical market information, and establishing e-business linkages between African and U.S. companies. Over 140 African businesswomen created their own, self-reliant U.S.-Africa Women's Business Alliance. Forty women have set up websites, or begun advertising their goods over existing sites. During a training session in Kenya a woman uploaded a picture of her jewelry on an existing trade forum, and received an order two days later.

EDUCATION

Leland is helping disparate universities in a number of countries to unite into national education networks, the fundamental building block of the rapidly globalizing education world. The Leland Initiative formed the Kenya Education Network (KENET), uniting twenty-one public and private universities spread across the country into a powerful advocacy and development group. In a unique public-private venture with the Kenya national phone company, U.S. technology will bring high speed Internet to all KENET locations country-wide, and to all surrounding users. Leland worked with the Kenyan policymakers to win Internet price reductions of $48,000 per KENET university, or more than $1 million per year.

Leland is helping similar national education networks to be built in Guinea, Mali, Rwanda, Uganda and South Africa.

In April 2001 in Uganda, a unique partnership comprised of USAID, AVAYA Corporation (a leading U.S. technology firm), Schools-on-Line (a U.S. NGO) and Hewlett-Packard inaugurated the Makerere University wireless Internet backbone, a state of the art network linking 18 campus buildings and the off-campus medical school. Today a Makerere student with a suitably equipped laptop can sit in a classroom or simply on a bench anywhere on the campus and access the Internet via wireless technology, something being introduced now on leading university campuses in the United States.

TELEMEDICINE

The Leland Initiative is working with the Department of Emergency Medicine of Howard University Medical School to train emergency medical workers and provide on-line case consultations to the South Africa University of the Transkei via the

Internet. In prior years this type of partnership depended on expensive staff exchanges and the mailing of videotapes.

DEMOCRACY AND GOVERNANCE

The free flow of information is the lifeblood of democracy. The Leland Initiative has formed Internet networks of democracy stakeholders focused on the executive, legislative and judicial branches—the "checks and balances" institutions. Through these networks, stakeholders share lessons learned and new approaches for increasing citizen participation in policy formulation, democratic local governance and anti-corruption drives. Electoral commissions are being linked and voter registration is being computerized. National legislatures are using the Internet to do better research and interact with constituents. In the Democratic Republic of the Congo, USAID helped a democracy NGO to establish a cybercafe, which is busy from dawn to dusk.

AGRICULTURAL PRODUCTION

In KwaZulu Natal Province in South Africa Leland Initiative experts helped the Black Farmers Union to set up Internet Information Centers, through which more than 1,200 farmers now access banking services on-line, saving themselves an 80 mile roundtrip. They also now get information on the price and availability of key agriculture inputs such as fertilizer in real time, rather than having to work through costly and inefficient middlemen.

Lessons Learned:

In addition to supporting major policy reforms, providing a dozen national Internet gateways, encouraging over 100 private Internet Service Providers, and helping hundreds of thousands of Africans to tap the Internet to accomplish development, what lessons have we learned from the Leland Initiative and its expenditure of taxpayers' dollars?

First, policy reform matters, and USAID has a comparative advantage in facilitating it. Policy reform has a high leverage value. By working with ten countries that wanted to set aside monopolies and deregulate almost immediately, major policy reforms were accomplished, bringing private sector investment, expertise and energy. And, by patiently waiting and providing assistance only after countries became convinced of the value of policy change, Leland was able to win adoption of major reforms. In Kenya, for example, Leland pricing reforms sent wholesale costs tumbling, saving Kenyan consumers more than $20 million per year in Internet access charges.

Second, good policies unleash the African private sector, just as they do in the United States. The private sector is using its own resources and expertise to bring the Internet to rural Uganda, Democratic Republic of Congo, Mozambique, Guinea and elsewhere, based on policy assistance and market development provided by the Leland Initiative. Small business cybercafes are springing up throughout the Leland countries in response to cheaper and more reliable wholesale Internet access. Entrepreneurs have recently paid $1.1 billion for national cellular licenses in Nigeria, and are now investing almost $500 million to build the infrastructure. The Leland Initiative is working with the Nigerian Communication Commission to strengthen its policy and regulatory capacity.

Third, the Internet is an effective way to attract non-traditional partners to the development challenges in Africa. The Makerere Wireless Backbone project noted above generated approximately $400,000 of contributions from the U.S. technology industry.

The Leland Initiative is teaming with Cisco Systems to establish the Cisco Networking Academies Program in nine Leland countries, through which hundreds of computer networking specialists will be trained each year. In this partnership, Cisco is providing approximately $1.2 million of equipment, a 540-hour training curriculum, access to a modern, Internet-based "Learning Engine" and training of trainers on how to use it.

Universities throughout the United States and Africa are now entering partnerships, facilitated by Leland Initiative technical assistance and technology. For example, a modest feasibility study and pilot project provided by the Leland Initiative enabled Tufts University to win a $240,000 grant from a major foundation to implement joint teaching and research in partnership with Makerere University and the University of Dar es Salaam. More than thirty such partnerships have been formed, using resources from a variety of development partners.

THE CHALLENGES AHEAD

The partner countries of the Leland Initiative have shown the dramatic changes that can occur when courageous policymakers and a vigorous private sector work together to introduce new ways of empowering people and doing business.

In the next few years, the key policy challenge will arise in the regulatory arena, as technologies change and converge. More than thirty African governments are establishing telecommunications regulatory bodies, and most of them are asking for help to establish a pro-competitive regulatory environment, maintain a level playing field among all the private sector actors, large and small, and get services out to where the market does not reach. We estimate that approximately 3,000 regulatory officials in Africa will need to be trained in order to take on this challenge. We have recently begun working with the Telecommunications Regulatory Association of Southern Africa and Cisco Systems to deliver distance education courses based on Federal Communication Commission training modules. We are working today to form similar regulatory associations in Western and Eastern Africa, as a way of increasing skills, harmonizing regulatory approaches and promoting regional integration.

A second key challenge will be to build capacity within the major institutional users to employ the Internet and its tools for economic and social development. Distance education, telemedicine, e-government and e-commerce hold great promise for African and American interests alike. But, all of them require major increases in institutional capacity to adopt sound information strategies and then find the right technologies to make them work. The democracy networks noted above need to be expanded, to bring new countries into existing networks and facilitate networks of new types of stakeholders.

VI. CLOSING

Mr. Chairman, thank you again for the opportunity to describe to your committee the achievements of our courageous and vigorous partners on the Leland Initiative. On behalf of the African policymakers, the private sector, and the Leland Initiative coordinators in USAID missions in Africa, it has been a true privilege to celebrate the life of Congressman Mickey Leland through this Initiative.

Mr. ROYCE. I will ask you two questions, and then we can move to the other Members of the panel here.

In your testimony you mentioned that initially you were willing to work with those countries that were willing to adopt, as you said, friendly policies. Can you discuss the dynamics of the telecommunications section reform that is going on in Africa, and what is the biggest impediment to getting policies right? I assume that you have expanded now beyond your initial engagement with friendly countries, and so maybe you can tell us a little bit about how those that aren't too helpful on the reform front—you know, about the impediments there and how we might affect that.

Mr. SMITH. I would be happy to. Actually we continue to work with all the countries, whether they had friendly policies or unfriendly policies, but we refuse to provide the countries with inappropriate policy environment with the kind of equipment and other kinds of technical support that they wanted. We continued to provide them with information about what we felt was the right way to do it, about what their neighbors were doing, the results, the successes of their neighbors.

I really attribute the difficulty in policy change primarily to two factors. One is a lack of awareness, and there are a number of people working on those kinds of things. And the second is really a resistance to change, or in a certain way I call it a lack of will, but it primarily revolves around the fact that in every kind of policy change, there are going to be winners, and there are going to be loser s, and if the losers remain more powerful or more effective, then they are going to be able to stand in the way.

What we have found most helpful is continuing to do two things: Build demand so that there is a big consumer demand pressure in those countries on the providers or on the bottleneck point s; and then the second thing, of course, is just continue to make available to those policymakers some of the policy options that they might want to take.

And incidentally, I would like to mention that we are now using the Internet to do that in a number of cases through discussion groups, through Web sites and through sort of targeted e-mailings. We think that those are areas where this kind of support can be scaled up considerably.

Mr. ROYCE. In your testimony, you mentioned that 40,000 Kenyans are now paying $30 to $40 a month for Internet access, and, as you note, that is an awful lot of money. What value are these Kenyans getting for their investment, and why is it that high?

Mr. SMITH. The price of Internet is really related to the cost of the international circuit. It begins with that, whether you can get into a fiberoptic line, which, of course, is incredibly cheap, or whether you have to go through a satellite dish. And Kenya has something like what they call six megabits of international satellite or international Internet capacity now, which has expanded threefold in the last couple of years. That is very expensive. It runs about 25,000 to $30,000 a month per megabit. These are prices related to the satellites and a number of other issues that are being resolved.

The Kenyans are taking advantage of it in a wide variety of ways. There are cybercafes springing up all over Nairobi and the other major cities, and those cybercafes allow a person to walk down the street and send an e-mail off to his brother who might be working in New York, or to his cousin who might be in Uganda, or a number of other kinds of places. There are also a number of schools now that are taking advantage of access to teaching materials and other kinds of things.

In a big-business sense we learned a couple of years ago that the car market in Kenya is filled mainly by importing used cars from the Gulf, and when the Internet arrived and became more affordable, then that industry began shifting all of its sourcing, its pricing and other kinds of things through that process. We are also finding that within the government there is, and within the parliament there is, a tremendous interest in being able the access these kinds of things.

Thirty to forty dollars a month is a considerable amount, but the fact that people are willing to pay it to me is the strongest endorsement of the value of these tools.

Mr. ROYCE. Let me go to Mr. Houghton of New York.

Mr. HOUGHTON. The costs seem to be so high. I don't know what the average annual income would be in one of the countries that you were referring to, but to pay 30 or $40 a month would be exorbitant.

Mr. SMITH. For a rural villager or even an urban person working and making $100 a month or $300 a year, $500 a year, that is a lot of money. The value of the development of cybercafes is that you can go into that cybercafe and for 25 cents get e-mails off to

all the people you want to get off, and if that cybercafe is a smart businesswoman or businessman, that operator, he will teach you the tricks. He will sit down with you and maybe even take your dictated e-mail offline so you are not consuming services.

Mr. HOUGHTON. You mean cybercafes run by the post offices of the different countries, or are they all private?

Mr. SMITH. In fact, they are almost exclusively private. The post office is typically a public-private joint venture where an Internet service provider will join with the post office to operate the service.

Mr. HOUGHTON. What percentage is fiberoptic, and what is through the air?

Mr. SMITH. I don't know those exactly, but my intuitive feel is about—that it is about 80 percent through—except for South Africa—about 80 percent through satellite circuits and only about 20 percent through the fiberoptics. I would be happy to get information on that back to you if you would like.

Mr. HOUGHTON. Sure.

You talked about unleashing unexpected results. Could you sort of elaborate on that a little bit?

Mr. SMITH. Well, one of the most unique, I think, was a young woman who was a student in Madagascar, and she had been made aware that there were actually scholarships available in France and in Europe, but she didn't know how to apply for them, so she wrote a letter and got a letter back by post saying that, yeah, we have scholarships available, and the deadline is day after tomorrow. And so the only way that she could respond was to get on the Internet, get the information downloaded and then submit her application by e-mail. And she, in fact, is studying in France today as a result of the scholarship that this won her.

When we put the Internet into Labe, which is a secondary city in Guinea, the first person to sign up was a furniture maker. He had a computer and understood the value of computers, and he said, I am going to be the first person here on the Internet. He began bringing down furniture designs and other kinds of things like that in order to boost up his services.

We worked with a number of small firms in Uganda on the use of computers and the use of information technology and were able to help them produce major improvements in their cash flows based on their ability to reach beyond the borders of Uganda for either better pricing, better materials or better customers, and an example would be a firm called Midland Financials, which only had about a $10,000 turnover working only in Uganda, and now has more than $2 million worth of turnover as a result of its work arranging international lines of credit and other kinds of activities like that.

Mr. HOUGHTON. Sure. But let me get back to these costs. In other words, somebody is making $500, and they spend $360 of that $500 on monthly costs. I mean, it is not possible.

Mr. SMITH. No, it isn't.

Mr. HOUGHTON. So what is the breakthrough in order to enable you to do what you think is possible there?

Mr. SMITH. Well, the main thing with this is that you continue to need—the delivery mechanism of the Internet is going to be the pricing factor. If it comes down via satellite dish, if it goes too ex-

pensive to install telephone line, if it requires you buying your own computer or these kinds of things, then it is going to be too expensive for the person making $500 a year. The person making $500 a year needs to be able to walk down to the corner store and use the Internet down there. And there are a number of very successful models in Africa, Senegal is one I am thinking of, where they have got something like 10,000 small corner telephone store s where you can make a telephone call, make a fax or do any number of things like that. It is a win-win situation because the telephone company in Senegal now generates 35 percent of its telephone calls through these 10,000 little phone booths, and they are all run by private entrepreneurs, women, men, family businesses.

So the key really is continuing to introduce competition, continuing to make it available through communal types of supply when that is appropriate, but really allowing the full range of African and U.S. Entrepreneurial spirit to come to play.

Mr. HOUGHTON. Thank you.

Thank you, Mr. Chairman.

Mr. ROYCE. Thank you, Mr. Houghton.

Mr. Hilliard.

Mr. HILLIARD. Thank you very much, Mr. Chairman.

Going back to the cost factor, let me make sure I understand you. The $30 or $40 you are talking about is expressed in terms of American currency?

Mr. SMITH. Yes, it is.

Mr. HILLIARD. And the $500 you were talking about in terms of the annual salary of an individual is expressed in their country's currency?

Mr. SMITH. Yes, it is, but the equivalent of $500 U.S. might be the annual income for a person, the per capita—sort of per person income in a country.

Mr. HILLIARD. All right. So actually we are talking about an individual who is an entrepreneur, and he receives funds from other sources for use of the Internet service that he has?

Mr. SMITH. We are talking about two approaches. One, the person is making $500, is probably not an entrepreneur, and would not be paying the $40 a month for a subscription fee. That is the person who would benefit from being able to go down to the corner kiosk and make access to it. But the businessman who is maybe making $5,000 or $10,000 of turnover, he is going to be able to see this 300 to $400 of access fees dramatically increasing his——

Mr. HILLIARD. I understand the math. The question: How long will it take for that $30 to $40 to get down to $5 or $10, and what factors are we talking about that will bring the cost down? Because people cannot get access if they cannot afford it. It is just not going to happen!

Mr. SMITH. The key to success in the telecommunications industry is volume. The more users you can get on there, the more collective purchase capacity you bring to bear on the consumer side, and the more quickly the private sector is going to be able to bring in the big volumes. The satellite pricing when you buy it in small chunks is extraordinarily expensive. It is expensive when you buy it in big chunks, too, but it is proportionately much, much lower.

The second factor is going to be the fiberoptic supply which is coming to Africa. Senegal, for example, just tied into a fiberoptic line and now has incredibly low prices for its access, something on the order of $14 a month for all you can use for a subscriber in Senegal. So the key is really going to be continue to build volume and continue to allow the private sector, encourage the private sector to bring in the new technologies, whether it is fiberoptic, whether it is new satellite type of services that is coming. And I believe one of the witnesses in the second panel is going to be speaking about some of that technology, but as far as I am concerned, the absolute critical element is the ability to just continue to focus on lowering prices. That builds volume. That brings lower prices.

Mr. HILLIARD. Perhaps the next panel will discuss this, but in your opinion is there anything we can do through our NGOs that would speed up the reduction in cost?

Mr. SMITH. Absolutely. In fact, one of the best introduction mechanisms, if you will, is a successful NGO, an NGO that is already working in a community. If we can figure out a way to get a mobile telephone into that NGO——

Mr. HILLIARD. What type of telephone?

Mr. SMITH. Cellular telephone or a mobile telephone through which you can then get access to the Internet. That NGO is already experienced in working in that community, and it knows how to take this new tool and make it available, all of its uses available. There are some very promising model s where the telephone itself becomes an economic, an earning potential for the village, where a village woman or a village cooperative buys a telephone or a cellular telephone or three or four telephones and then resells those services. So not only do you get the communication benefit into the community, but you get the economic growth benefits of the technology as well.

I think that—quite honestly that the NGOs and the private sector—and I sort of lump them into one category when I talk about it like that—are really the two key factors in terms of getting this out and as well used as it possibly can be.

I do think that the pricing is one of the key restraints, and I guess the second constraint that I would put on them besides pricing is appropriate content, appropriate tools, and applications that can flow through this technology. And, again, there are a number of promising ones being developed for people who can't read, for example. They are working on oral or voice recognition kinds of technology or icons where a farmer can go to the field agent and say, okay, well, here is what I am seeing on my crop. The field agent can use icons to bring up the kinds of recommended treatment for something like that. We think there is quite a bit of potential in terms of moving that technology to the other sectors, whether it is health or environment or even local government.

Mr. HILLIARD. Thank you very much.

Mr. ROYCE. Thank you, Mr. Hilliard.

We will go to Mr. Flake.

Mr. FLAKE. Thank you for your testimony. There is a lot of leapfrogging, as you know, technology with IT. This project has been going on for about 5 years now? Oh, I am sorry, 5 years? How long is the project? About 5 years. Have we wasted any money laying

copper cable, paying for copper cable and doing some of these things? Have there been—you mentioned many of the successes. What have been some of the disappointments so far?

Mr. SMITH. Well, those are two different questions. One is we actually felt blessed by the change in technology because it has gotten a lot cheaper and a lot more powerful. We have always focused on trying to get sort of the latest technology. When we first starting put these gateways into the Leland countries, we called Sun Microsystems up and said, we understand you are coming out with a brand new server, and we understand there is a big waiting list for it; well, we want to be at the head of the line. We think what we are doing out there is pretty important.

And we got them to actually commit 20 of these Sun servers to us, pulled out of the production line ahead of delivery to other customers so we could get them in out there, and that has characterized pretty much what we have been doing with the technology all the way along. I will point out that those Sun servers are still working in those gateway s and are still—you know, we have had 4 years of operation with them without failure. So it is not secondhand stuff.

We put some copper wire stuff in, but it was primarily to put in lease lines from the Internet service providers to the phone company, and those were going to be encouraging that they replace with wireless as they need to replace them. At this point they don't need to.

The biggest disappointment is a difficult one for me because I see the potential of the technology, and I see how well countries progress when they adopt the kinds of policies we have talked about when they really unleash the private sector and the consumers. And so I guess the biggest disappointment for me will be that there are still countries out there that are still struggling with this question, really trying to figure out how they can reach out to the private sector and yet retain some of the comforts they have with the old way of doing business.

And so from that perspective I am disappointed. I think the approach that we have taken all along is the right one, though, which is that we are not going to help those countries build out their infrastructure unless they are ready to do the right things in the policy sense, and we are going to continue to build the capability of their consumers, which we have been doing, but we really don't think that it is appropriate to cave in at this point and say, no, no, okay, you have made the case, you are not going to be in the private sector, so we will go ahead and help you build it out.

Mr. FLAKE. Some of the disappointment domestically has been we wired a lot of schools, helped to pay for that, a lot of schools, it is new, it is exciting for a while, and then it is like surfing through the channels, nothing is on.

You mentioned some of the problems with applicability and finding the right applications here. Do you sense—and we will get some of this in the next panel—sustainability problems? Will people figure it is worth 30 to $40 a month, whether that is individually or communally? Do you have those worries?

Mr. SMITH. Mr. Flake, those are questions that are right on the money, and I do have worries. I guess I, myself, watching the hype

related to the Internet in 1996, am frustrated that we all have trouble taking advantage of this technology. I mean, I get 500 e-mails every day or send them and can't manage that system myself.

The applications, the potential for distance education or for telemedicine or for these other kinds of things are slower coming than the promise that we heard 3 or 4 years ago. On the other hand, I really believe that the African consumers are best positioned to make the decision, and when they are paying $40 a month for the kind of access that they get, given their economic climate, they are making the decision that it is right for them.

In terms of sustainability, one of the things that I believe USAID has been good at has been focusing on not putting stuff out there without adequate support, whether it is agricultural technology or education or any other kinds of things, and within the Leland Initiative when we were designing it, we wanted to make sure that didn't happen. So I am not saying that there aren't some computers out there that we have put out there that might have broken down, but we have really emphasized the need for two things: one, that they be properly trained on how to use it, and that there is a private sector Internet service provider or computer firm that can provide maintenance, ongoing support for it; and two, that we sit down with them and work pretty carefully through what is going to happen when they have to start paying those monthly telephone bills or they have to start paying the Internet access charges.

Sustainability is absolutely the key, and I think it is a point that we have really tried to emphasize, and the Africans have certainly nudged us every time we have moved away from that.

Mr. FLAKE. Thank you.

Mr. ROYCE. Thank you, Mr. Flake.

Thank you, Mr. Smith.

I think we will go now to our next panel. We very much appreciate you taking the time, and Mr. Park as well, to come down and be with our Committee today.

On our second panel we are going to have Dr. Ernest Wilson, III. He is director of the Center for International Development and Conflict at the University of Maryland, College Park. He is also senior adviser to the Global Information Infrastructure Commission. Dr. Wilson has recently consulted on digital divide with organizations including the World Bank Global Business Dialogue and the National Science Foundation. Dr. Wilson has had a distinguished career in academia and government. He received his Ph.D. at UC Berkeley.

We have Dr. Gail Ifshin. She is the executive director of the Discovery Channel Global Education Fund, a charitable organization that brings educational resources to children living in remote areas of the world. She has served as an economist with the Hungarian American Enterprise Fund. Dr. Ifshin also was a program director for the Institute for Democracy in Vietnam. Dr. Ifshin received a Ph.D. in economics from the University of Maryland.

Mr. Noah Samara is the Chairman and CEO of WorldSpace, a company with a mission of dispersing information us ing a new satellite-based infrastructure. He has had a long career in the satellite telecommunications field. Mr. Samara has published articles in the

fields of satellite communications and international law. He earned his master's degree in international business from Georgetown University.

So we will start with Dr. Ernest Wilson, and I would ask each of you to just try to summarize your testimony, if you would, and keep it to less than 5 minutes, because we have read your written testimony, and that way we can go to questions.

Dr. Wilson.

STATEMENT OF ERNEST J. WILSON, III, PH.D., DIRECTOR, CENTER FOR INTERNATIONAL DEVELOPMENT AND CONFLICT MANAGEMENT, AND SENIOR ADVISOR, GLOBAL INFORMATION INFRASTRUCTURE COMMISSION, UNIVERSITY OF MARYLAND

Mr. WILSON. Thank you very much, Mr. Chairman. It is a real pleasure and a delight to be before your Committee today dealing with such an important topic.

I would like to do three things here with you today. One is briefly describe what is happening in Africa both in its own terms and then relative to other developing countries. Secondly, I would like to explain very briefly why we see the outcomes we do in Africa, the political issues, the institutional issues. And then thirdly, I would like to suggest a few things that Congress may wish to consider as it moves forward and thinks about legislation.

Let me give you my bottom line, and this goes to some of the questions that some of the Members have talked about this afternoon, and that is that IT is really, really important for African economic and political and social development. Often this is articulated as an either/or question, that hospitals can only afford Bandaids, or they can afford bandwidth. That is a false dichotomy. The fact of the matter is that given the African situation today, unless there is investment in IT and health, in transportation, and especially in education, then regrettably Africa will fall farther behind because it does not yet have these new technologies.

So that is sort of my bottom line, Mr. Chairman, that it is very important, and I think this underscores the importance of your Committee paying attention to this issue, sir.

In brief, Africa has come a long way in the diffusion of information and communications technologies over the past 5 or 6 years. You have heard some of those figures already. Let me just give you another one. Not only in terms of Internet, but even something as basic as radio, which I know we will have further discussion on on this panel, as a result of political liberalization and democratic openness, the community radio stations in Mali, a poor West African country, have jumped from less than a handful to more than 60 radio stations, and many of those radio stations in turn are fed by Internet connections.

So the point I want to make is that both for the more modern technologies like the Internet, but also for more basic ones like radio and television, we have seen a huge expansion in what Africans have been doing over the past 4 or 5 years. Eleven countries were connected to the Internet in 1996. Today virtually all 54 countries and territories are connected. So this has been a dramatic and very, very important development.

However, relative to the rest of the world, Africa, in fact, is falling behind. I won't go into the figures here, but let me simply say that on Internet connection and even on telephone connection, Africa is moving ahead, but South Asia, East Asia, et cetera, are moving along even further. So relative to the rest of the world, Africa is falling into a kind of digital divide.

One of the reasons that might account for these outcomes, is that the African information revolution, like the one in the United States, is not a technology revolution. The information revolution is a political revolution. It is a policy revolution, and it is an institutional revolution. When countries get their policies right, and they have strong institutions, as in Singapore, then they have positive information revolution changes. But the policy, the training, the institutions must be there first.

The principal reasons, then, for Africa's relative gap or divide have to do with policy limitations and institutional limitations.

Let me conclude, Mr. Chairman, by suggesting simply a handful of new directions or additional things that the Committee and the Subcommittee may wish to consider. One fairly straightforward is to renew the Leland Initiative. I would, however, suggest that rather than concentrating on pipes, policy and people, that one concentrate on policy, less attention to pipes, continue to build up the human infrastructure, but really emphasize in the legislation and the recommendations more partnerships between public, private and NGO groups, both in this country and in Africa.

Secondly, I would suggest ways of linking an ICT proposal to the AGOA Act, which just recently passed, both in terms of getting American companies engaged, but secondly, use the new technologies to link up African entrepreneurs and American entrepreneurs.

Thirdly, there probably needs to be even greater interagency attention to ICT. The FCC, the Commerce Department and others have made a good start, but that needs to be accelerated, in their cooperation with AID, for example.

There are new things that could be done with conflict management in Africa as another initiative. There are several others that I might propose. I will simply just rattle them off: Work more with African multilaterals like the Economic Commission for Africa, and, finally, to really push for more cooperation and partnership among the various groups like the private sector, the government sector and NGOs.

Thank you, Mr. Chairman.

Mr. ROYCE. Thank you, Dr. Wilson. I appreciate your suggestions very much.

[The prepared statement of Mr. Wilson follows:]

PREPARED STATEMENT OF ERNEST J. WILSON, III, PH.D., DIRECTOR, CENTER FOR INTERNATIONAL DEVELOPMENT AND CONFLICT MANAGEMENT, AND SENIOR ADVISOR, GLOBAL INFORMATION INFRASTRUCTURE COMMISSION, UNIVERSITY OF MARYLAND

Thank you, Mr. Congressman:

My name is Ernest J. Wilson III, and I am Director of the Center for International Development and Conflict Management, at the University of Maryland, College Park. I also serve as Senior Advisor to the Global Information Infrastructure Commission, an association of private sector CEOs and senior executives from around the world, including Africa. I have been an advisor to the Economic Commis-

sion for Africa, the African Development Bank and other Africa-oriented organizations.

I. INTRODUCTION

Thank you for inviting me to share with you the results of my research on information and communications technology (ICT) and Africa. In my short presentation I wish to do three things: firstly, provide an overview of the status of ICTs in Africa today, both in terms of Africa's own progress in diffusing the new technologies across the sub-regions, as well as its status relative to ICT diffusion in other developing areas. Second, I will point out that these different diffusion patterns are driven largely by public policy and politics. Finally, I want to suggest several steps that the U.S. Congress and the Executive branch can take to advance Africa's access to these new technologies, thereby advancing the interests of African people, the United States and, I believe, the interests of a more developed, democratic and peaceful world community.

Let me give you my bottom line: ICTs have become an essential tool for both economic growth and democratic participation in the modern world, and Africa must accelerate its access to these new tools. And since effective access to the full benefits of ICTs comes mainly through (1) education and training, (2) effective institutions; (3) visionary leadership and enlightened public-private coalitions, and (4) financial and other resources, then the United States can make the greatest contribution to ICT growth in Africa by addressing those four central elements—training, institutions, visionary leadership and resources. Please note that I have not said 'technology' is key because getting the technology is the easy part. Technology we can buy off the shelf. The hardest part is getting the proper education, institutions and leadership in place that enable the technologies to spread.

The Information Revolution in Africa as in the United States is not merely a technology revolution—it is mainly a political, policy and institutional revolution.

II. AFRICA'S CURRENT ICT STATUS

Africa On Its Own Terms

Africa has come a long way fast in the diffusion of Information and Communications Technologies. The International Telecommunications Union reports that over the course of the 1990s the telephone growth for 10 countries exceeded 10% annually. Old media like TV and radios expanded quickly, mainly after the political liberalizations and democratic openings of the past decade. For example, community radio stations in Mali jumped from less than a handful to more than sixty. We should never underestimate the importance of radio and television for Africa—for every one telephone, for example, there are 14,384 radios and 2,538 television sets. Internet use has also skyrocketed, and today virtually every country is connected. Cell phones have taken off as well.

Exciting commercial initiatives are under way, some by American companies like Cisco or SBC, which put in about one billion dollars into the South Africa telecoms privatization program. There are also new "back room" investments in data processing in Ghana by U.S. insurance companies. U.S. based ALLAFRICA News is providing content across the continent. And local capitalists like Nii Quaynor in Ghana are investing more as well.

Of course, within Africa as a whole, there are a lot of regional differences. South Africa is the ICT giant as it is the economic giant, with one half of the three million computers on the continent. It also has 20 times more telephone lines and twice as many home satellite antennae, and most of Africa's Internet users by far. If we take South Africa out of the statistics, we find interesting internal diffusion patterns in Africa. While West Africa leads the other regions in mobile telephones and television sets per capita, the southern and eastern regions lead in Internet accounts, while central Africa has a very high cell phone rate per capita.

Africa and the Rest of the Developing World

But if Africa is doing well today in terms of its recent past, it is not doing so well relative to the rest of the world. Indeed, it is falling further behind in some areas. With 12% of the world's population, in the early 1990s it had only 2% of global telephone lines. Yet even that meager number fell to eight-tenths of one percent by decade's end. In the mid-1990s Africa had only .25% of all the world wide web sites. A year later, that figure fell to 22%. East Asia and Latin America are far outshining Africa in most areas of ICT.

Here American policy makers should take heed of the latest global figures. Most developing regions are falling behind the rich nations. Africa is simply at the tail end of a trend that is leaving even better off regions in the dust. In a study commis-

sioned by the infoDEV program at the World Bank co-authored with my Maryland colleague Francisco Rodriguez, we found that the poor countries of the world were expanding their ICT consumption by 18% a year, which is good. But the rich countries were growing their consumption of ICTs by a whopping 23%, 5 points higher than the developing nations, thereby seriously increasing the global digital divide. And Africa is at the back of the pack.

III. FOUR REASONS FOR AFRICA'S CURRENT STATUS

There are four principal reasons for the outcomes we see in Africa.

Low Level of Economic Development

Poor people and poor countries consume less ICTs than rich people and rich countries. That is a hard fact of life, and it explains about 60% of the differences between countries. With 12% of the world's population, Africa gets less than 1% of the global investment. It is home to most of the poorest nations. Not surprisingly, it has poor ICT infrastructures too. Yet even within this "iron law of ICT and income," there is some variation. Countries at the same level of GDP/PC can have higher or lower levels of ICT penetration. What explains the difference? The differences come from the next three factors—policy, institutions and leadership.

Quality of the Public Policy

The world is going through a 'great transformation' today, as it did during the industrial revolution of the 1800s. And like the Industrial Revolution, this one too hinges on creating a viable policy environment for the spread of new technologies. New technologies always ride on the back of public policy that creates the incentives and enabling environment for private, NGO and public sector actors to deploy these new tools. Where the policy provides positive incentives to individuals, then they will use them. Where governments put roadblocks like import tariffs, or time-based tariffs, or poor education systems, or political repression, then fewer individuals take up the new tools.

The policy steps needed to diffuse information and communication technology are by now well recognized globally, from Taiwan to Thailand to Tanzania. It is not rocket science. Good diffusion requires as a necessary (but not sufficient) condition: clear and unambiguous shifts from the old policy balances of public over private, monopoly over competition, domestic over international and centralized over decentralized administration, to a new model that shifts the balances more in the other directions. Where African governments like those of Ghana or Uganda shift the balances, everybody responds. In other countries like Kenya or Zimbabwe the pace of change is slower than it would be because of poor policies.

Quality of Institutions in the Public and Private Sector.

But it is tough to get good ICT policies without good institutions to design and implement the policies. This includes everything from the structure, staffing and performance of the Ministry of Communications, to state owned enterprises, and especially, to the new regulatory agencies. One cannot emphasize enough the impor-

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Accenture/UNDP/Markle Foundation report for the upcoming July G–8 summit in Italy that insists on cross-sectoral collaboration.

IV. STEPS FORWARD TO DEEPEN AND CONSOLIDATE ICT IN AFRICA

Africa has now breached the doorway of the Information Revolution, and virtually every capital is connected to the Internet. The challenge now is to deepen that diffusion. This means deepening public understanding, helping strengthen the relevant institutions, regulations and laws; educating and training more people not only to operate off-the-shelf systems, but to learn how to design their own systems for the own local African conditions. Here are a few ideas the Subcommittee may want to consider.

Bilateral Initiatives

Renew the Leland Initiative. But build on its successes and shift some of the emphasis from hardware or 'pipes' to building up privatization of and 'Partnerships' with local ICT champions in the ICT industry, with business, NGOs and local community groups. This could be Leland Phase II, with new funding and the support of the new AID Administrator.

ICT and AGOA. Build some explicit ICT components into the AGOA initiatives, both as commercial opportunities for U.S. ICT companies, but also use ICTs as tools to link African and American business people. Create a 'virtual AGOA' community of commerce.

Greater Inter-Agency Attention to African ICT. One should encourage the relevant USG agencies to pursue their own initiatives in ICT and Africa, and to coordinate them. The FCC has done excellent things here, as has USTR and Commerce. That must continue.

Encourage More Attention to ICT and Conflict Resolution in Africa. There is general recognition that unless Africa's terrible wars and conflicts are reduced, then the chances for ICT or any other development are slim. There are techniques and technologies that can be deployed in Africa to build cross group and cross border confidence, including efforts in on-line communications, promoting 'peace radio' and other strategies.

Encourage More Private-Public Partnerships: Companies like Cisco, Motorola, SBC and others are active in Africa, and many are seeking ways to penetrate even further. Remember that while a .5% Internet penetration rate seems abysmally low, a smart marketer sees the other side—the 99.5% part is a platform for growth. And Cisco is actively seeking ways to extend its Cisco Academies to Africa's poorest nations to bring them the benefits of the networked economy. Imaginative ways must to be found for the White House, State, AID, Commerce and others to help promote partnerships in Africa. For example, musical genius Quincy Jones and his Listen Up Foundation are exploring ways to do exactly that. With additional support from AOL Time Warner Foundation, he is creating partnerships and resources to build greater awareness, education and training in Africa, including a possible "Silicon Valley in South Africa" project.

Multilateral Initiatives

Work with African Multilaterals. The U.S. needs to find better ways to work more with African institutions on these issues. For electronic commerce or e-development, the Economic Commission for Africa and its dynamic director Dr. K.Y. Amoako have taken some imaginative steps to help the continent. These African multilateral efforts should be supported. The OAU also needs support for IT and peace keeping.

Be bold at the Genoa G–8 Meeting. Urge the White House to use the upcoming G–8 Genoa summit as an "action forcing event" to come up with a proposal for Africa, perhaps tying an ICT initiative with an AIDs initiative. Also, the U.S. has taken the lead in urging our G–8 partners to engage their private sectors and, most interestingly, their NGO organizations, to participate in the G–8 process to help reduce the digital divide and enhance digital opportunities. This broad-based initiative will build domestic support and ideas, and encourage other G–8 governments and societies to do the same.

V. CONCLUSION

Mr. Chairman, your committee has a wonderful opportunity to lead your fellow legislators to a new level of commitment to help Africa move into the Information Age. Such new initiatives will be good for Africa, they will be good for America, they will be good for a more democratic, economically vibrant and politically stable world community as well. If Africa misses the Information Age, like it missed joining the Industrial Age, we can expect only less democracy and more autocracy; less development and more poverty; less respect for the US and more bitter envy; less social

stability and more social conflict. ICTs are only one set of tools among others to help Africa's people to pursue their own development. But it is an important set of instruments and America should be great enough to help Africans gain those tools to build a better tomorrow.

Thank you for your attention. I would be happy to answer any questions you may have.

Mr. ROYCE. We will go to Dr. Ifshin.

STATEMENT OF GAIL IFSHIN, PH.D., EXECUTIVE DIRECTOR, GLOBAL EDUCATION FUND, DISCOVERY CHANNEL

Ms. IFSHIN. Thank you, Mr. Chairman and Members of the Committee, for inviting me to be here this afternoon. As you said in your opening comments, the Global Education Fund is a nonprofit organization working to narrow the information technology divide by bringing remote communities in Africa and elsewhere information through television, video and satellite. As I speak, the Global Education Fund is active in 50 schools in Africa alone. In South Africa, Uganda, Tanzania and Zimbabwe, we are reaching about 40,000 schoolchildren and their parents, their communities, local NGOs, teachers, making available to them the huge amount of information that is accessible via the medium of satellite, video and television technology, covering a range of subjects from curriculum support, to history, to science, to technology, to health information, to developing entrepreneurial skills.

For me, the look of wonder and amazement on the faces of children living in rural Zimbabwe, many of whom are seeing television for the first time, watching a video in their own language on the Great Zimbabwe, which is a World Heritage site in Zimbabwe, or on electricity, is a reminder of the powerful educational potential of this medium that so many of us take for granted. Video has some wonderful attributes as an information technology. It can convey information to a large group of people all at one time. It can provide valuable information to people who cannot read.

The Global Education Fund works in schools which we call Learning Centers. Each Learning Center is a locally managed, collaborative partnership with the local community. We work together to tailor the project to meet their specific needs. We equip the Learning Centers with a donated television, VCR, satellite dish and access to programming, and that is just the beginning. We understand full well that introducing technology into settings for the first time is a development project. We do not parachute technology into a school and expect it to work all by itself. So as a result we make a 3-year commitment to working with local communities to train, to provide programming that is appropriate, that meets their needs, and to help them integrate the technology as a tool in their everyday lives.

We do not simply rely on traditional means of electricity. Two billion people around the world have no access to electricity, and we don't think that is a good reason for them to be left out. An example of our commitment to sustainability and solar power is the solar-powered television and VCR we have mounted on a library cart that is pulled by donkeys. Now, people living in villages inaccessible even by SUV have access to both books and information via the video technology.

We are committed to providing video programming from any source on any topic to these project sites, and right now we are putting a particular emphasis on working hand in hand with indigenous AIDS organizations. We want to leverage the resources we are providing these Learning Centers, which are often located in areas where the AIDS crisis is most prevalent, and yet are underserved by AIDS organizations in part because of their location and a presumed lack of access to communications technology. As our project demonstrates, these problems can be addressed.

I would like to close by inviting the Committee to visit a Learning Center the next time you are in the region. I believe that by seeing with your own eyes, you can truly understand the impact that this relatively simple technology can make on people's lives.

Thank you for inviting me here today. I would be happy to answer your questions.

[The prepared statement of Ms. Ifshin follows:]

PREPARED STATEMENT OF GAIL IFSHIN, PH.D., EXECUTIVE DIRECTOR, GLOBAL EDUCATION FUND, DISCOVERY CHANNEL

INTRODUCTION

Increasing access to education and information remains one of the greatest challenges facing countries around the world. A good education and the availability of information technology are ever-increasing determinants of economic development. It is well known that economically disadvantaged populations, often living in crowded, remote, and rural areas, suffer from limited access to quality educational resources.

DISCOVERY CHANNEL GLOBAL EDUCATION FUND

Discovery Channel Global Education Fund is a 501(c) (3) charitable organization committed to narrowing the growing information gap between developing and developed countries. Spearheaded in 1996 by Discovery Communications, Inc. (DCI), Discovery Channel Global Education Fund's (DCGEF's) ambitious mission—to bring the empowering benefits of technology to one million children by 2005—reflects a firmly grounded understanding of the power and feasibility of bringing a world of information via television, video cassette and satellite to children no matter where they live, however remote or under-resourced.

Through the establishment of Learning Centers in schools and community centers, children and their parents suddenly have access to the same quality and range of information available to connected, better-resourced areas of their own countries, and the world. DCGEF is committed to helping communities master the opportunities of video as the multipurpose and flexible teaching tool it can be. Students are encouraged to explore the world and relate it to their own frame of reference: the community in which they live. Other video content can address topics ranging from literacy training to developing entrepreneurial skills to HIV/AIDS.

Consider some of the attributes of video: one television and VCR can convey a wide array of information to large groups of people at one time; video is a gender-neutral tool, providing equal access to information to girls and boys; video gives teachers and health care workers the ability to convey complicated information in a consistent way; and video can carry information to people who do not know how to read.

To date, DCGEF has established about 60 Learning Centers in 6 countries: South Africa, Tanzania, Uganda, Zimbabwe, Peru and Mexico. The Learning Centers reach about 60,000 students. After almost 4 years of careful project development, experience in customizing programming and training for project recipients on two different continents, and into 3 very different languages (Spanish, English, Ndebele—a local Zimbabwean language—and soon, Romanian), we are looking forward to replicating the project within the countries where we are currently active, as well as into new countries and continents.

PROJECT ELEMENTS

The project elements outlined below allow DCGEF to maximize the value of the information available via the medium of television and video to children in the classroom and the community at large:

- DCGEF makes a three-year commitment to each site, including programming delivery, teacher resource guides, training and monitoring. New programming will be delivered beyond 3 years as long as the equipment is being used.
- Donation of television, video deck, and satellite technology.
- Training of local coordinators to train teachers and others in the use of the technology as well as in the interactive use of videos as a teaching tool.
- Training and support to teachers to use their interactive video and training skills to integrate video programming into their schools and communities on a wide range of subjects.
- Commitment to bring video-based resources into participating schools that may help meet the community's varied needs, including health-related programming, gender issues, life skills, business development, marketing and agricultural development.
- Action plan to promote community involvement with the DCGEF project.
- Support for local school communities in learning how to sustain the Learning Center through creative use of video/satellite equipment and programming.

In order to achieve maximum sustainability, project field staff for Learning Center projects are local community members. The project emphasizes "training the trainers" in order to develop sustainable indigenous capacities at all Learning Center sites. Technical assistance is carefully designed to build a local infrastructure and impart lasting skills that can support the use of video and satellite technology to provide a wide range of informational and educational resources.

DCGEF seeks out partnerships with governments, NGO's and the nonprofit sector, and any other entity whose activities complement those of DCGEF, or leverage the Learning Center technology in a way that brings additional benefits to the communities where they are located. For example, we are happy to work with organizations providing sustainable computer and Internet projects, and invite them to take advantage of Learning Center infrastructure. Partnerships like these allow Learning Centers to truly serve as an information "hub" meeting the diverse needs of the local community and of the surrounding villages and communities.

PROGRAMMING CONTENT

DCGEF is committed to help each community obtain broadcast, satellite services, and most important, video programs that meet their needs, on any subject and from any source.

For example, we are committed to work hand-in-hand with indigenous AIDS organizations to help them create, and distribute, HIV/AIDS-related information to the regions with Learning Centers. The rural areas where we work are often where AIDS is most prevalent. Nevertheless these areas tend to be underserved by grassroots AIDS organizations because of their location and a presumed lack of access to communications technology. DCGEF is changing that presumption through the Learning Center project.

DCGEF produces award-winning educational videos specifically for its Learning Centers. Developed in collaboration with educators and parents from the communities served by the project, these videos supplement a school curriculum with magnificent images of our earth, science and technology, world history and culture. DCGEF videos provide added value to any existing curricular objective or programming. DCGEF brings to the project extensive in-kind services in the form of video production resources made available by Discovery Communications, Inc. DCI's contributions, including access and rights to its library of high quality documentaries and footage, enable DCGEF to affordably produce and distribute free of charge high quality programming customized to the needs of its audiences in Africa and elsewhere.

SUPPORT

The support of Discovery, our founding sponsor, is responsible for the development of the project in Africa from its inception to our current total of about 50 project sites in 4 African countries, including the creation of mobile library/audio visual carts equipped with a solar-powered television and VCR—pulled by donkeys. These

mobile donkey carts now bring books and information via video to villages inaccessible even by SUV.

The participation of Motorola, Inc. as a corporate sponsor facilitated the successful expansion of DCGEF's Learning Center initiative from Africa to Latin America, where DCGEF currently is active in 8 schools in Mexico and Peru.

In order to expand the reach of Learning Center projects, DCGEF seeks donations from foundations, corporations and individuals who share our commitment to expanding the Learning Center project and making a tangible difference in the world.

CONCLUSION

Technology is only as valuable as the information it provides its users. And video is a very powerful tool. One television and VCR can convey a whole world of information.

Discovery Channel Global Education Fund is proud to have developed a practical, realistic, culturally appropriate, sustainable and flexible technology project in under-resourced areas in Africa. Our mission is to continue to replicate this project in schools and community centers throughout Africa, and to bring the empowering benefits of technology to children and their communities.

We would like to invite the Committee to visit our Learning Centers during your fact-finding visits to Africa. Only by visiting our project sites can you get a true understanding of the difference this information technology is making in people's lives.

Thank you for giving me the opportunity to be here today.

Mr. ROYCE. Thank you, Dr. Ifshin, and I will take you up on that, and we notice Mr. Payne did take you up on that. I saw him in one of the presentations here.

We are going to go now to Mr. Samara.

STATEMENT OF NOAH A. SAMARA, CHAIRMAN AND CEO, WORLDSPACE CORPORATION

Mr. SAMARA. Thank you, Mr. Chairman, honorable Ranking Member, distinguished Committee Members. I am actually very, very happy to be here.

Africa is, I believe, on the wrong side of the information technology divide, causing huge disparities in income and health education, in governance. All of these things are well known to the Committee. It is said if you listen to Africa, you will hear a continent calling 911, but with due respect to the Committee's present deliberations, that call is not going through, and it is not getting through because of the dire, indeed grotesque, situation of IT in Africa.

Telecommunications is the central nervous system for any modern society. Africa lacks the information wherewithal to provide even the basic levels of education and health and stability to its inhabitants. Wallace Stevens once said, it is not a visitation, it is not apparition, it is presence, part of that simplified geography in which the sun comes up like news from Africa.

To be sure, the picture is hardly one of unredeemed bleakness. There are examples like that of Aetna Insurance efforts to boost its back-office operations from Ghana, and many of these similar types of small inputs will end up yielding big change and big results. This is the essential concept behind the WorldSpace initiative.

Today the WorldSpace AfriStar satellite, which is operating in Africa, is delivering information directly to hundreds of thousands of individuals across the continent, and it is a matter of only a few years before we begin to deliver information to millions of people.

I am here actually this afternoon to ask that you work with us to accelerate an urgent race against time to infuse Africa with information directly relevant to its development. The WorldSpace

system was inspired by the urgency of the AIDS crisis. We wanted to empower Africans, some 10 years ago, with information to protect their health by broadcasting information from a satellite directly to a very small, inexpensive receiver. I have an example of such a receiver right here. This is what it looks like. It is very small and very teeny, and this is the entire satellite dish that a person needs to actually receive lot s and lots of information directly in the form of audio or in the form of Internet access.

Ten billion—I mean, 10 years and a billion dollars later we have actually implemented our system. The map up there shows the reach of the AfriStar satellite. WorldSpace is today actually delivering scores of audio programs directly to the entirety of Africa, and this is not all. We have just started a multimedia service where you can connect the same receiver without the need of a telephone, and by connecting this receiver you can deliver gigabites of information directly to people into their computers. This receiver today costs something like $50, and we expect it to go down in price.

Bending Africa's reality to fit our view of technology, I believe, is absurd. To put it bluntly the Internet does not and cannot reach Africa, and I don't see it doing so in a very short period of time. I do see a satellite approach like that of WorldSpace doing so. In fact, WorldSpace is reaching Africa today, and these satellite receivers are being distributed throughout the continent.

The only thing that stands between 600 million people becom ing a true market for American good s and American services as well as American interests is information. What Africa needs is information. At the end of the day, the IT discussion should focus not so much on technology, but on how we deliver information directly to people. If we can use the horn of an animal to actually deliver information, that is really what is critical. How we get that information should really be immaterial. The WorldSpace system, I believe, with the help of the U.S. Government, can today actually connect every village and every neighborhood to the electronic consciousness of mankind.

When we talk about IT and the needs of Africa, that should be our concern is how to connect the continent to the electronic consciousness of mankind. We are already working, as my written testimony outlines, with USAID and NOAA, but we can do more, and we can do that sooner.

Thank you, Mr. Chairman.

Mr. ROYCE. Thank you, Mr. Samara.

[The prepared statement of Mr. Samara follows:]

PREPARED STATEMENT OF NOAH A. SAMARA, CHAIRMAN AND CEO, WORLDSPACE CORPORATION

Mr. Chairman, honorable ranking member, distinguished committee members, I am pleased to join you this afternoon to take part in a discussion of great importance to Africa and the world.

That Africa is on the wrong side of an "information technology divide" should surprise no one. Disparities in income, health, education and governance separate Africa from the rest of the world. The inequality grows every day, a gap that widens to the detriment of all humanity.

It is said, if you listen to Africa, you will hear a continent calling 911. With respect to this hearing's subject—information technology, this call is not getting through.

I am sure the members of this subcommittee have heard the remarkable statistics used to illustrate the information technology divide: that there are more telephone

in geostationary orbit to broadcast digital audio programs directly to small, inexpensive receivers.

To abbreviate a saga, we have realized our infrastructure. In 1998, WorldSpace launched AfriStar, the first satellite designed, built and launched expressly to serve Africa. In 1999, Africa became the first place on earth to receive the new medium of satellite direct radio.

This map shows the reach of the AfriStar satellite: Africa and the Middle East, plus spillover coverage of Europe. WorldSpace delivers scores of audio programs directly to the entirety of Africa. But that's not all.

Connect a WorldSpace satellite receiver to a personal computer and it becomes a wireless modem capable of downloading hundreds of megabytes of text, data, software and images every day.

Mr. Chairman, bending Africa's realities to fit our view of technology is absurd. To put it bluntly, the Internet does not currently serve all of Africa and will not be able to do so for years to come. WorldSpace does.

This is the gateway to abundant information for Africa: the WorldSpace receiver, the least expensive satellite media terminal ever devised.

The only thing that stands between 600 million people becoming a true market for American goods and services is information.

We built the tools, but everyone knows government must provide the environment. In the environment of Africa, many federal agencies have a strategic imperative to communicate to vast areas:

- The Diplomatic Corps;
- The U.S. Agency for International Development;
- The Voice of America;
- The Office of International Information at State;
- The Commerce Department; and
- The Department of Defense.

Though the WorldSpace system has only been in operation since 1999, there have already been notable joint efforts between various federal agencies and the WorldSpace Foundation. Founded in 1997, the WorldSpace Foundation (WSF) is a publicly supported 501(c)(3) nonprofit organization headquartered in Washington, DC, USA. As a founding endowment, WorldSpace Corporation has granted WSF five percent of its total channel capacity on all WorldSpace satellites. The WSF mission is to help improve the lives of disadvantaged persons in developing regions of the world by providing access to education and other information broadcast directly to radios from satellites.

In Africa, WorldSpace Foundation helps bridge the digital divide by partnering with African education and development groups to deliver distance education and social development information via the Africa Learning Channel, an collective effort that brings indigenously produced content on health and education to all of Africa.

The foundation looks to grants, donations, corporate funding, other foundations, and government sponsored programs as sources of support.

The WorldSpace Foundation and United States Agency for International Development (USAID) have maintained an active relationship in pursuit of their joint goal of providing education and social development opportunities in the developing world. As a registered PVO with USAID, WSF is regularly asked to participate and present at applicable USAID conferences and workshops. WSF has been a panelist at two

HIV/AIDS Education Project

WSF has subcontracted with Africare on a major USAID HIV/AIDS education initiative in Zambia and Uganda. This initiative will take advantage of WorldSpace Foundation's channel capacity and production capability by placing HIV/AIDS audio content on the Africa Learning Channel. Not only will WSF be responsible for uplinking the programming to the Afristar satellite, but it will also post-produce all of the content. In addition to the audio component of this five-year project, Africare will distribute multimedia adapter cards throughout the two countries to community health centers. The adapter cards will give the health centers access to the extensive library of health information available on the foundation's multimedia service. This project results from a subcontract with USAID through Africare.

BESO Project

The Basic Education Systems Overhaul (BESO) Project is a USAID project that is considering incorporating the WorldSpace system into its ongoing work in Ethiopia. This project proposes to use the WorldSpace Foundation's multimedia service to provide teacher training materials to teacher support centers throughout Ethiopia. Because of Ethiopia's rugged terrain, many of these centers are cut off from the rest of the country and cannot access many of the services that the government offers. Using the WorldSpace system, teacher training and support materials will be transmitted directly to these isolated centers. The specifics of this project and the role of WSF are currently being negotiated.

WSF has also built a strong relationship with the National Oceanic and Atmospheric Agency (NOAA). NOAA has been a tremendous supporter of WorldSpace Foundation activities and was a major catalyst in pushing WSF to further develop the excellent multimedia service that it offers today. WSF and NOAA are currently working together on two projects. These projects are:

Climate Information Project

In Niger, WSF and NOAA, working together with the African Center for the Applications of Meteorology to Development (ACMAD), have developed a network of community information centers that utilize both the foundation's audio and multimedia service. NOAA has produced state of the art meteorological content, including up to the minute satellite weather pictures and graphs. NOAA's content is then broadcast on the WSF multimedia service and eventually downloaded by agriculture extension workers, national meteorological centers and even local farmers. With this satellite imagery, it is possible to make long range weather pattern predictions, which are essential for crop selection and maximization.

Climate Early Warning System

NOAA and WSF have also collaborated in producing an early warning system that can help protect African countries from excessive loss of life during severe weather. With target countries like Mozambique, this early warning system gives national meteorological services the ability to track severe weather patterns that may pose a threat to their population and then warn their population accordingly. With this technology, national governments will have a new tool in preventing unnecessary loss of life in natural disasters. This project is a direct contract with NOAA.

These joint efforts of federal agencies and WSF represent an excellent start, certainly one in which the U.S. Government and WorldSpace can both take pride. However, we can do more for Africa, much more. From our standpoint at WorldSpace there is no better partner in this work than the United States Government, unquestionably the greatest force for democracy, justice and development in modern times.

Mr. Chairman, Honorable members of the committee, the best way to answer Africa's 9–1–1 call is to empower that continent with abundant information. By doing this, we make Africans capable, serve the strategic interests of the United States and create a more stable and prosperous world.

Thank you.

Mr. ROYCE. Have you been working on HIV/AIDS education as part of that project?

Mr. SAMARA. Yes. We are actually now working with USAID and Africare to deliver HIV—information on HIV and AIDS directly to NGOs and to various health professionals in the continent. We are working also with—we are just beginning a coalition with the ITU, the International Telecommunications Union, and the World Health Organization to do a different initiative in Ethiopia, and so

we are doing these little pockets of pilot studies, and each one of these are beginning to actually yield results.

Another initiative that we did is sometime on the eve of the millennium, we actually did a dance party where we had one of these receivers connected to a PA system in five disparate locations in Nigeria and Ghana. We invited people, and there was music, people danced to the music, but every so often the music would stop, we would deliver information, and the local operator of the receiver would then get into some kind of local dialogue, and at the end of the day, or at the end of the evening, people were asked to come back. Many came back.

So these are the kinds of things that we are doing actually to address the issue of delivering information on AIDS directly to Africa.

Mr. ROYCE. Dr. Ifshin, have you utilized your distance learning programs to try to broach the subject of AIDS education. How effective have those programs been?

Ms. IFSHIN. Yes, we have, and as I mentioned earlier, the Global Education Fund Learning Center project provides technology to communities that would not otherwise have access to a range of information available via the medium of television and video. In all the countries where we work, we are contacting local AIDS organizations in order to locate any existing programming or broadcast information available on HIV/AIDS, which we can then bring to the attention of the Learning Center communities.

Further, we are developing relationships with organizations on the ground, and exploring how we could work together to create programming specifically that will help promote prevention and education messages, and even treatment and healthcare messages to people living in remote rural areas.

Mr. ROYCE. I will ask one last question, and then will allow each of the other Members to ask a question because we have a vote on. You mentioned in your written testimony that you don't parachute in equipment and expect something will happen in Africa. Do you see many cases of that occurring where things are basically offered, but can't be utilized because of the lack of the training and skills divide or whatever?

Ms. IFSHIN. I do, and I think that anyone who has done any development work in Africa has seen some examples of that. Mr. Smith acknowledged that it happens sometimes, and for many different reasons. I have been in schools where there are computers gathering dust or locked in a closet gathering dust because people are afraid to use them. As a result, we realize we are not doing anyone any good unless we make a commitment through local management to be there, making sure that technical assistance and training are available. Doing efforts locally on the ground that really provide value, enough value to the technology and the content that it can communicate to avoid the kinds of situations that you are talking about.

Mr. ROYCE. I thank you very much.

I am going to go to our Ranking Member Mr. Payne for a question then to Mr. Flake and then to Mr. Hilliard.

Mr. PAYNE. Thank you very much. I will be very brief since we have to be out of here in less than 10 minutes.

But I might just ask Mr. Wilson, do you work closely with the U.S. Government, or is there funding, and do you think that—and secondly, do you think that with the increase in these peace radios, for example, do you think there have been a positive impact on the potential conflicts or conflicts in the region.

Mr. WILSON. Let me answer the first question: As I have indicated in my correspondence with the Committee, our center at Maryland has done some work with the Leland Initiative. We have also done work with the World Bank, with the U.N., with other agencies of the executive branch.

Let me give a counterexample, Congressman Payne. During the Rwanda genocide, as you know, one of the principal instruments that was used to promote the genocide was the radio, and I think what this points out is that no communication vehicle in and of itself solves social problems. There is no magic bullet. There is no automatic solution, and it really is the uses to which people put these institutions or these technologies.

There are positive efforts; the United States Institute of Peace and others have been promoting programs to try to do the opposite, to get groups who may not want to talk to one another face to face to agree to sit down around a broadband two-way television set and communicate in that way. So I think, yes, sir, there are programs moving ahead now, but they have been underutilized, and I think as Africa gets more connectivity, that it would be very important to use these kinds of technologies.

Mr. PAYNE. Thank you very much.

Just real quickly, this is a very interesting device, Dr. Samara, but let me just ask my last question to Ms. Ifshin.

How were you viewed initially when you went in and said, we have a product we would like to—we want to do this here in your country; was it—what sort of obstacles? Did everyone say, oh, great, we have been waiting for you, or were there obstacles to overcome?

Ms. IFSHIN. They said they had been waiting for us. In a more serious vein, we have always been careful wherever we worked to first touch base with government officials, particularly the ministries of education and technology. We introduce ourselves and explain what we have to offer. We make ourselves available to address those concerns. I think once they understand really how benign the project is, once they understand we are there to help and reach out to some of the schools they have the most trouble reaching, that we have some resources to put to that use, that we are happy to work with them to complement any ongoing initiatives they have in long-distance learning, to help distribute any programming that they have created, once they understand truly how much this project is owned by the local community and that we are not there saying, you should look at this, you should watch that, but rather we are providing the tool and the support the tool needs to be truly useful, then it is really like pushing on an open door.

Mr. ROYCE. Mr. Flake and then Mr. Meeks.

Mr. FLAKE. One question. I was fascinated by the article earlier this month by Thomas Friedman about going to Ghana to check on his health insurance, seeing that Aetna has a large data processing center there. Can any of the panelists tell me, is that happening

elsewhere in Africa, or is that an aberration? Is there a good future for that?

Mr. WILSON. Based on my own knowledge of the situation, Congressman, is that that is not happening as much as it should. It happens more, as you know, in India or to a certain extent in the Caribbean, but my hunch is that as the price for those kind of services goes up in the Caribbean and it goes up in India, that you will see a migration toward Africa where the cost will, in fact, be lower, assuming that the kind of political or economic liberalization takes place to allow the infrastructure to be built.

Mr. ROYCE. Mr. Meeks.

Mr. MEEKS. I will be real quick.

Mr. Samara, I know that last year you began multimedia programming, and I believe you talked about AIDS. I was just wondering are you projecting to do any additional programming, and what type of programming are you projecting to do in the future?

Mr. SAMARA. We are actually right now delivering a pilot multimedia project in Nairobi before we completely roll out the service throughout the continent. But the multimedia project we are delivering is basically integrating a lot of Internet-type data and delivering it directly to people, and actually we are doing this right now, and for a the foreseeable future we expect to deliver most of the information, unless it is specialized, on a free basis. We are basically an advertising-driven type of service rather than a subscription service where people have to pay 20, 30 or whatever dollars they have to pay to access the Internet.

Mr. ROYCE. I know Mr. Payne had another question, and we are going to go to Mr. Payne.

Mr. PAYNE. Actually more of a quick statement. I just would like to compliment the Discovery Channel for creating a foundation that could move forward to work on educational projects in Third World and developing countries, and see Ms. Judy McHale in the audience, who is the president of that company. And I would just like to commend them, and I wish more companies would be good world leaders as you have shown in your projects with your initiatives.

So with that, Mr. Chairman, I yield back the balance of my time.

Mr. ROYCE. I thank you, Mr. Payne, and we have had some very interesting ideas put forward by our four panelists here today. One of the things I would like to do, Dr. Wilson, Dr. Ifshin, and Mr. Samara, is follow up with you. We very much appreciate your testimony. We appreciate your ideas about the Leland Initiative, too, and where you would take that, Dr. Wilson, and so we will probably be in touch on that as we move forward.

Thank you for taking the time to come over today to testify, and we best get to the vote, so this hearing is adjourned. Thanks.

[Whereupon, at 3:38 p.m., the Subcommittee was adjourned.]

APPENDIX

MATERIAL SUBMITTED FOR THE HEARING RECORD

PREPARED STATEMENT OF THE HONORABLE EARL F. HILLIARD, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF ALABAMA

I wish to thank the Chairman for holding this hearing. It is an important and pressing topic to millions here in the U.S. and in the continent of Africa.

We know that knowledge is key for a person's development, and now we must recognize that information is the key to a country's development. There are numerous barriers to overcome, but we cannot sit idly by and watch as many become disenfranchised and miss out on economic and educational opportunity.

Many state that most nations in Africa are struggling simply to provide basic needs for their people. To them I would say that access to information is basic and should be made available by the most efficient means available—that means today is high-speed communication. Basic needs are not met because many countries are excluded from participating in the marketplace, have little or no access to education, and information technology could be the way to bring about desperately needed change in all those areas.

We can help open the door to a meaningful solution with long term effects that have the capacity to reach into every sphere of society. There are many differences among the cultures in our world, but for the first time in history, we have a feasible way of tying it all together. This is an inspiring and unique opportunity for our generation, and we cannot be foolish and allow it to pass us by.

I am relieved and excited to see others who have similar concerns; and I am eager to hear how their thoughts and ideas have been put into action.

PREPARED STATEMENT OF CHRISTINE HEMRICK, VICE PRESIDENT, STRATEGIC TECHNOLOGY POLICY GROUP, CISCO SYSTEM

Mr. Chairman and Members of the Committee, thank you for the opportunity to provide testimony on the efforts of my company, Cisco Systems, to build technology skills and encourage the adoption of the Internet and other Information and Communications Technologies (ICTs) in Africa. Cisco Systems believes that in today's global economy, ICTs play a critical role in sustainable economic growth that can erode poverty, raise living standards, and promote national and international stability. Today I will address several of our initiatives relating to Africa with an emphasis on the importance of education and training, and the critical role that partnerships with public sector organizations like the U.S. Agency for International Development (USAID) have played in our progress thus far.

Last July at the summit of G–8 leaders in Okinawa, Cisco's President & CEO John Chambers made a commitment to invest an additional $3.5 million dollars into the Cisco Networking Academy Program in order to extend the program to at least half of the world's Least Developed Countries (LDCs) by the end of 2001. I am happy today to report that with the outstanding support we have received from the USAID and the United Nations Development Programme (UNDP), we are well on the way to achieving that aggressive goal. Of the 27 countries that are addressed by our LDC initiative, 22 of them are in Africa.

The Cisco Networking Academy Program was established in 1995 and uses Internet & computer based technology to train individuals on how to design, deploy, maintain, and repair data networks. This 280 hour, 4 semester curriculum, available in 9 languages, has now been adopted in 121 countries around the world, with over 6500 academies, and 157,000 students currently participating.1 Developing skilled workers with this expertise is an indispensable step in integrating Informa-

tion & Communication Technologies into any nation's economy. One of the Networking Academy instructors from Togo who recently concluded his training, M. Fiadjoe Tsatsou, provided an articulate commentary on this point:

> "During this time of globalization, the new economy based on the information systems imposes itself on the world. Africa still seeks a way to attain a real and lasting development. It is evident, especially in Africa, that the most important capital is a well-prepared and trained workforce. The Cisco Networking Academy Program offers an unprecedented opportunity for our continent to have qualitative training and attain globally recognized certification, thus integrating into the world economy. It is now up to the participants of the Academy Program to truly familiarize themselves with Information Technologies, so that they may transform Africa's great potential into profitable values for social development."

Less than one year after our commitment to the LDCs was made, we have several hundred students enrolled in classes that are already underway in Bangladesh, Benin, Bhutan, Chad, Malawi, Mauritania, Nepal, Rwanda, Tanzania, Togo, and Zambia. In addition, agreements are in progress, instructors are being trained and classes are scheduled to begin over the next three months in Angola, Burkina-Faso, Cambodia, Central African Republic, Democratic Republic of the Congo, Djibouti, Eritrea, Ethiopia, The Gambia, Guinea, Haiti, Lesotho, Mali, Mozambique, Niger, and Uganda. As part of the same training and deployment, academies have also started classes in the adjacent non-LDC African countries of Cameroon, Cote D'Ivoire, Ghana, Kenya, Nigeria, and Swaziland. Overall, by the end of 2001, we expect to have a total of at least 45 academies in these 27 LDCs, plus 6 non-LDC countries. Of these, at least 36 academies will be in Africa.

When our LDC initiative was announced last July, there were many who expressed skepticism that we could achieve the goal of establishing an ICT-based training program in some of the world's poorest countries in an 18 month timeframe. In fact, were it not for the outstanding efforts of our partners, especially the Leland Initiative of the USAID, and the UNDP, the skeptics would certainly have been correct. I cannot overemphasize to you how critical a role these organizations have played. In addition to offering overall expertise, advice, and encouragement to us in launching the LDC initiative, USAID has played a major role specifically in Malawi, Mail, Mozambique, Rwanda, Tanzania, Uganda and Zambia. They have aided greatly in the identification of appropriate institutions to host Academies, in building local and national support, in obtaining necessary approvals, and in acquiring pre-requisite computer infrastructure and Internet connections. The vision & leadership of Lane Smith at the USAID Leland Initiative has been essential in forging the agreements and processes that allowed a private sector company like Cisco to work efficiently and effectively with a government agency.

While education and training is one prerequisite for success in the expansion of ICTs in Africa, it is well understood that challenges to growth in their use are numerous, complex, and country-specific.

In the process taking the Networking Academy Program to Africa, we have encountered complications due to war, work stoppages, transportation difficulties, customs problems, lack of education funding, cost and availability of computers, and even controversy over the value of "practical training" versus "classical education". But it is clear that one of the most fundamental barriers to ICT development in Africa is the scarcity of reasonably priced Internet connections, even for low and moderate bandwidth speeds.

It is widely acknowledged that telecommunications policy reforms, as well as adequate policy enforcement, is a major requirement for spurring investment, increasing deployment and lowering the cost of bandwidth in Africa. As a consequence, it is our view that U.S. assistance that builds regulatory capacity and quality is one of the most valuable investments that can be made in the future of the African ICT infrastructure. Toward this end, we initiated another project directed at Africa and the developing world, and in partnership with the U.S. Federal Communications Commission, the USAID, and the Cisco Learning Institute. These four organizations have worked together to investigate and prototype the use of network-based learning technology to train developing world regulators. The learning technology used as the foundation for this project was provided by the Cisco Learning Institute (CLI).2 CLI is a non-profit, public benefit, corporation that was funded and formed by Cisco Systems in 1999 with a mission to advance the use of technology in education and training. The FCC and USAID provided experts to generate content on regulatory topics such as spectrum management and the implications of the convergence of voice and data communications. Cisco Systems provided funding to CLI to convert that content to an online format and prototype various features of a net-

work-based learning curriculum. Today, as you are receiving this testimony, USAID personnel are in South Africa conducting a training session using this tool, and collecting feedback from African regulators, as part of the process of evaluating its value and effectiveness. As in the case of our collaboration on Networking Academies, we have welcomed this opportunity to combine our core competences in technology and education with those of our public sector partners in policy and economic development in an innovative approach to regulatory capacity building.

As opportunities have arisen, Cisco has also participated in other ICT-training and assistance projects in Africa. These include delivering "ISP Workshops" (technical training classes to Internet Service Providers), and providing specialized technical assistance to a consortium of Kenyan ISPs establishing an Internet Exchange Point (IXP) within the country. Internet Exchange Points are architecturally important within the infrastructure of the Internet because they allow ISPs within a country to pass traffic among themselves without having to go outside the country. Such in-country connections are typically of faster speed, higher quality, and lower cost than using international connections. Once Internet Service Providers have been trained to understand how to technically design, deploy, and maintain an Internet Exchange Point, the barriers to their establishment typically center around regulatory prohibitions and constraints (which exist in some countries) and in determining an appropriate business and ownership model.3 Where established, however, IXPs not only benefit in-country Internet users, but have helped to defuse international disagreements over issues such as the need for regulations to mandate the costs of Internet connections between other nations and the United States.

While we are happy with the progress we have made on these initiatives so far, we realize that many serious challenges still exist to bringing "digital opportunity" to the developing nations of Africa. I would like to conclude by reiterating our sincere appreciation for the partnership and support of organizations like the USAID whose role has been and will continue to be critical to our African efforts. Thank you for the invitation to provide this testimony and we would be happy to provide additional information on any aspect that you would like to further investigate.

1 More information on the Cisco Networking Academy Program is available at "www.cisco.com/edu".
2 More information about the Cisco Learning Institute is available at www.ciscolearning.org
3 Around the world, various models, both for profit and non-profit exist for the establishment and operation of Internet Exchange Points.